

HIGH DENSITY PLASMA PROCESS FOR THE FORMATION OF SILICON DIOXIDE ON SILICON CARBIDE SUBSTRATES

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ABSTRACT OF THE INVENTION

Methods are provided for forming silicon dioxide (SiO₂) on a silicon carbide (SiC) substrate. The method comprises: providing a SiC substrate; supplying an atmosphere including oxygen; performing a high-density (HD) plasma-based process; and, forming a SiO₂ layer overlying
10 the SiC substrate. Typically, performing the HD plasma-based process includes connecting a top electrode to an inductively coupled HD plasma source. In one aspect, SiO₂ is grown on the SiC substrate. Then, an HD plasma oxidation process is performed that creates a reactive oxygen species and breaks the Si-C bonds in the SiC substrate, to form free Si and
15 C atoms in the SiC substrate. The free Si atoms in the SiC substrate are bonded to the HD plasma-generated reactive oxygen species, and the SiO₂ layer is grown.